

Amendment and Response Under 37 C.F.R. 1.116

Applicant: Michael Bauer et al.

Serial No.: 10/562,252

Filed: July 5, 2006

Docket No.: I431.140.101/FIN480PCT/US

Title: ELECTRONIC MODULE AND METHOD FOR THE PRODUCTION THEREOF

IN THE CLAIMS

Please cancel claims 1-10, 12, 13, 26 and 36.

Please amend claims 11, 14-16, 27 and 37 as follows:

1-10. (Cancelled)

11. (Currently Amended) An electronic module comprising:
a first and a second component with connections on connection sides of the components;
a wiring block made of plastic with contact pads on its outer sides and with lines
comprising nanoparticles with carbonized short-circuit paths between the nanoparticles in its
volume, the lines electrically connecting the contact pads on the outer sides to one another
according to a circuit layout, the first component and the second component being arranged on
different non-opposite outer sides of the wiring block and the connections being connected to the
contact pads.

12-13. (Canceled)

14. (Currently Amended) An electronic module comprising:
a first and a second component with connections on connection sides of the components;
a wiring block made of plastic with contact pads on its outer sides and with lines
comprising ~~The electronic module according to claim 11, comprising wherein the lines comprise~~
anisotropically oriented nanoparticles in its volume, the lines electrically connecting the contact
pads on the outer sides to one another according to a circuit layout, the first component and the
second component being arranged on different non-opposite outer sides of the wiring block and
the connections being connected to the contact pads.

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15. (Currently Amended) An electronic module comprising:
a first and a second component with connections on connection sides of the components;
a wiring block made of plastic with contact pads on its outer sides and with lines in its
volume, the lines electrically connecting the contact pads on the outer sides to one another
according to a circuit layout, the first component and the second component being arranged on
different non-opposite outer sides of the wiring block and the connections being connected to the
contact pads;

~~The electronic module according to claim 11, comprising~~ wherein the lines comprise
carbonized plastic, the lines including nanoparticles with carbonized short-circuit paths between
the nanoparticles, including comprising and wherein the lines comprise anisotropically oriented
nanoparticles.

16. (Currently Amended) An electronic module comprising:
a first and a second component with connections on connection sides of the components;
a wiring block with contact pads on its outer sides and with lines comprising
nanoparticles with carbonized short-circuit paths between the nanoparticles in its volume, the
lines electrically connecting the contact pads on the outer sides to one another according to a
defined circuit layout, the first component and the second component being arranged on different
outer sides of the wiring block and the connections being connected to the contact pads;
wherein the wiring block includes a plastic volume through which the lines extend, and
includes at least six outer sides configured for population with electronic devices or components,
such that line routing through the wiring block is configurable for three-dimensional wiring
between contact pads.

17. (Previously Presented) The electronic module according to claim 16, comprising the
wiring block including vertical line routing, horizontal line routing, or line routing at different
solid angles, thereby achieving reduced length wiring paths and reducing propagation time
delays within the wiring block.

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18. (Previously Presented) The electronic module according to claim 16, comprising wherein a configuration of the line routing is three-dimensional.
19. (Previously Presented) The electronic module according to claim 18, comprising wherein the line routing is configured as a spiral.
20. (Previously Presented) The electronic module according to claim 16, comprising wherein the line routing includes one or more lines configured as a sheet.
21. (Previously Presented) The electronic module according to claim 16, comprising wherein routing lines are configured as an electrical component.
22. (Previously Presented) The electronic module according to claim 21, wherein the electrical component is a passive electrical component.
23. (Previously Presented) The electronic module according to claim 21, wherein the electrical component is an inductive component.
24. (Previously Presented) The electronic module according to claim 21, wherein the electrical component is a capacitive component.
25. (Previously Presented) The electronic module according to claim 16, comprising wherein the lines comprise carbonized plastic.
26. (Canceled).

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27. (Currently Amended) An electronic module comprising:
a first and a second component with connections on connection sides of the components;
a wiring block with contact pads on its outer sides and with lines comprising ~~The~~
~~electronic module according to claim 16, comprising wherein the lines comprise anisotropically~~
oriented nanoparticles in its volume, the lines electrically connecting the contact pads on the
outer sides to one another according to a defined circuit layout, the first component and the
second component being arranged on different outer sides of the wiring block and the
connections being connected to the contact pads;
wherein the wiring block includes a plastic volume through which the lines extend, and
includes at least six outer sides configured for population with electronic devices or components,
such that line routing through the wiring block is configurable for three-dimensional wiring
between contact pads.
28. (Withdrawn) A device for producing an electronic module, comprising:
a casting mold for the introduction of plastic;
two focusable energy sources with an orienting device configured for guiding and
superposing the focus regions of the energy sources for forming lines of the wiring block to be
produced in the volume of the plastic to be introduced; and
at least one casting device for the continuous or layer-by-layer filling of the
casting mold with plastic with the formation of lines in the envisaged volume of the wiring
block.
29. (Withdrawn) The device according to claim 28, comprising wherein the focusable
energy sources are laser apparatuses.
30. (Withdrawn) The device according to claim 28, comprising wherein the device
comprises a microprocessor for controlling the energy sources.

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31. (Withdrawn) A method for producing an electronic module having two components on different outer sides of the wiring block, the wiring block comprising electrical contact pads, the method comprising:

introduction of plastic into a casting mold for the production of a plastic blank block;

partial carbonization of the plastic and/or partial agglomeration of nanoparticles in the plastic blank block to form lines of a wiring block according to a predetermined circuit layout by means of radiating in energy of two focused and guided energy beams from energy sources;

removal of the wiring block from the casting mold;

application of contact pads at piercing points of the lines on the outer sides; and

application of two components with their connections on different and non opposite outer sides of the wiring block.

32. (Withdrawn) The method according to claim 31, comprising wherein firstly at least one plastic layer with lines is produced and afterward further plastic layers arranged on the first layer are realized, lines being produced within the layers and from layer to layer by carbonization of the plastic and/or by agglomeration of nanoparticles in the respective plastic layer.

33. (Withdrawn) The method according to claim 31, comprising effecting the introduction of energy for forming lines by means of microwave excitation, by means of electromagnetic radiation or by means of ultrasonic radiation.

34. (Withdrawn) The method according to claim 31, comprising wherein firstly at least one plastic layer with lines is produced and afterward further plastic layers arranged on the first layer are realized, lines being produced within the layers and from layer to layer by carbonization of the plastic and/or by agglomeration of nanoparticles in the respective plastic layer, and

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comprising effecting the introduction of energy for forming lines by means of microwave excitation, by means of electromagnetic radiation or by means of ultrasonic radiation.

35. (Withdrawn) An electronic module comprising:

means for providing a first and a second component with connections on connection sides of the components;

a wiring block with contact pads on its outer sides and with lines in its volume, the lines electrically connecting the contact pads on the outer sides to one another according to a circuit layout, the first component and the second component means being arranged on different non-opposite outer sides of the wiring block means and the connections being connected to the contact pads.

36. (Canceled)

37. (Currently Amended) An electronic module comprising:

a first and a second component with connections on connection sides of the components;

a wiring block made of ~~The electronic module according to claim 11, comprising wherein~~ the wiring block comprise plastic with nanoparticles and having contact pads on its outer sides and with lines in its volume, the lines electrically connecting the contact pads on the outer sides to one another according to a circuit layout, the first component and the second component being arranged on different non-opposite outer sides of the wiring block and the connections being connected to the contact pads.

38. (Previously Presented) The electronic module according to claim 11, comprising wherein the wiring block includes at least six outer sides.

39. (Previously Presented) The electronic module according to claim 11, comprising wherein the contacts of the first and second components are flip-chip contacts.